

Roll No. ....

Total Pages : 03

BCA/D-20

1190

COMPUTER AND PROGRAMMING

FUNDAMENTALS

Paper : BCA III

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. Answer the following questions in short :
  - (a) Define the term Computer with Block Diagram. 2
  - (b) What is a Dynamic RAM ? 2
  - (c) Explain the term Application Software. 2
  - (d) What do you mean by Multiprogramming Operating System ? 2
  - (e) What is Debugging ? 2
  - (f) What is a Flowchart ? 2
  - (g) Explain Sorting. 2
  - (h) What is an Assembler ? 2

(5)L-1190

1

### **Unit I**

2. (a) Classify the Computer according to Size and Power. **8**  
(b) Explain various Computer Generations. **8**
3. (a) Differentiate between Primary Memory and Secondary Memory. **8**  
(b) What is ROM ? Differentiate between EPROM and EEPROM. **8**

### **Unit II**

4. (a) List various I/O Devices in detail. **7**  
(b) Write short notes on the following : **9**  
(i) Digitizers  
(ii) Plotters  
(iii) Magnetic Media Devices.
5. (a) Difference between Multiprogramming, Multitasking and Multiprocessing Operating Systems. **8**  
(b) How does Operating System act as user interface ? Explain in detail. **8**

### **Unit III**

6. (a) Differentiate between Testing and Debugging. **8**  
(b) Explain Problem solving in detail. **8**

7. (a) What do you mean by Structured programming ?  
Explain in detail. **8**
- (b) Describe the functions of various Flowchart  
Symbols. **8**

#### **Unit IV**

8. (a) Explain various types of Searching techniques with  
example. **8**
- (b) Write Algorithm to implement Selection Sort and  
Bubble Sort. **8**
9. (a) Differentiate between Compiler and Interpreter. **8**
- (b) What are the characteristics of High Level  
Language ? **8**

Roll No. ....

Total Pages : 03

BCA/D-20

1191

WINDOWS AND PC SOFTWARE

BCA-112

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

### Compulsory Question

1. (a) What is the purpose of taskbar in windows ?
- (b) How can you use Web Camera in Windows ?
- (c) Write steps to insert/delete rows and columns in Excel.
- (d) How can you use formula in Excel ? **4×4**

### Unit I

2. (a) What is a window ? Explain application and document window with examples.
- (b) What is a shortcut icon ? Discuss different methods of its creation. **8,8**

(2)L-1191

1

3. (a) What is a Window Explorer ? Explain its different facilities.  
(b) Discuss Paint and Word Pad Windows Accessories. **8,8**

### **Unit II**

4. (a) How can you install Hardware and Software in windows operating system ?  
(b) Explain Scandisk and Disk Defragmenter System Tools. **8,8**
5. (a) How you can share Folders and Drives in windows ? Explain with examples.  
(b) What is the purpose of Internet Explorer ? Explain its facilities. **8,8**

### **Unit III**

6. (a) Discuss various components of a Workbook.  
(b) Write steps to create and protect a Worksheet. **8,8**
7. Discuss Editing and Formatting features in Excel with examples. **16**

#### **Unit IV**

8. (a) Explain Logical and Statistical built-in functions in Excel.
- (b) Discuss various options of printing Workbook and Worksheets. **8,8**
9. What is a purpose of a filter ? Explain Auto and Advance filter in Excel by taking suitable examples. Differentiate Auto and Advance filter. **16**

Roll No. ....

Total Pages : 04

BCA/D-20

1192

MATHEMATICAL FOUNDATION-I

BCA-113

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory.

**(Compulsory Question)**

1. (a) Verify that  $(A \cap B)' = A' \cup B'$ , where  $A = \{2, 3, 4, 5, 6\}$ ,  $B = \{3, 6, 7, 8\}$  are subsets of  $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ . **4**
- (b) Find  $r$ , if  ${}^{10}P_{r+1} : {}^{11}P_r = 30 : 11$ . **3**
- (c) Find  $\frac{dy}{dx}$ , when  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ . **3**
- (d) Show that  $x^2 + 4y = 0$  is a solution of **3**

$$\left(\frac{dy}{dx}\right)^2 + x\frac{dy}{dx} - y = 0$$

- (e) Solve the differential equation : **3**

$$\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + y = 0.$$

### Unit I

2. (a) In a class of 1000 students, 625 students pass in Mathematics and 525 pass in English. How many students pass in Mathematics only and how many pass in English only ? **8**
- (b) In a set of integers, let a relation R be defined as  $aRb$  if and only if  $a-b$  is even. Prove that R is an equivalence Relation. **8**
3. (a) Find the number of arrangements that can be made out of the letter of the word PERMUTATION. In how many of these 5 vowels are together ? **8**
- (b) A polygon has 44 diagonals. Find the number of its sides. **8**

### Unit II

4. (a) Using  $\epsilon$ - $\delta$  definition, prove that : **8**
- $$\lim_{x \rightarrow a} \cos x = \cos a, \text{ where } a \in \mathbb{R}.$$
- (b) Differentiate :
- $$\tan^{-1} \frac{\sqrt{1+x^2}-1}{x} \text{ w.r.t. } \sin^{-1} \frac{2x}{1+x^2}. \quad \mathbf{8}$$

5. (a) If  $x^p y^q = (x+y)^{p+q}$ , prove that : **8**

$$\frac{dy}{dx} = \frac{y}{x}$$

- (b) If  $y = e^{\tan^{-1} x}$ , prove that : **8**

$$(1+x^2)y_2 + (2x-1)y_1 = 0.$$

### Unit III

6. (a) Find the differential equation of the family of the curves  $y = Ae^{3x} + Be^{5x}$ , where A and B are arbitrary constants. **8**

- (b) Solve the differential equation : **8**

$$(1+x^2)\frac{dy}{dx} + 2xy - 4x^2 = 0$$

7. (a) Solve the differential equation : **8**

$$(y \log x - 1) y dx = x dy$$

- (b) Verify that the differential equation :

$$x dy + y dy = a^2 \frac{(x dy - y dx)}{x^2 + y^2}$$

- is exact and solve it. **8**

#### Unit IV

8. (a) Solve the differential equation : **8**

$$\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} + \frac{dy}{dx} + y = \sin 2x$$

- (b) Solve the differential equation : **8**

$$\frac{d^2y}{dx^2} + y = x - e^{2x}$$

9. (a) Solve the differential equation : **8**

$$x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} - 4y = x^4$$

- (b) Solve the differential equation : **8**

$$(3x+2)^2 \frac{d^2y}{dx^2} + 3(3x+2) \frac{dy}{dx} - 36y = 3x^2 + 4x + 1$$

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1193**

LOGICAL ORGANIZATION OF  
COMPUTER-I  
BCA-114

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit in addition to compulsory Q. No. 1. All questions carry equal marks.

**(Compulsory Question)**

1. (a) What do you mean by Fixed Point Representation of Numbers ?
- (b) Differentiate between Coding and Convention ?
- (c) What do you mean by Switching Algebra ?
- (d) What are Boolean Postulates ?
- (e) What do you mean by Universal Gate ?
- (f) Explain NAND Gate.
- (g) Differentiate between Multiplexer and Demultiplexer.
- (h) Draw the logic diagram of Half Adder. **8×2=16**

**(3)L-1193**

## Unit I

2. Represent the decimal No. 8620 in :
- (a) BCD
  - (b) Excess-3 code
  - (c) 2421 Code
  - (d) as a Binary Number. **16**
3. (a) Solve the following : **8**
- (i)  $(130)_{10} = (?)_3$
  - (ii)  $(1000)_3 = (?)_{10}$
  - (iii)  $(8554)_{10} = (?)_6$
  - (iv)  $(221)_6 = (?)_{10}$
- (b) Perform the following using 8-bit notation and 2's Complement : **8**
- (i)  $(78)_{10} - (36)_{10}$
  - (ii)  $-(45)_{10} - (35)_{10}$

## Unit II

4. (a) What is Venn Diagram ? Draw Venn diagram for AND, OR, NOT operations. Also prove Second Absorption Law  $a + (\bar{a}b) = a + b$  using Venn diagram. **10**
- (b) Simplify  $\bar{X}\bar{Y} + X + XY$ . **6**

5. (a) Convert the expression  $F = (\bar{X} + Y)X + Z(Y + Z)$  into standard POS form. **8**
- (b) Examine the validity of :  
 $(XY).(YZ) = (\bar{X} + \bar{Y}).(\bar{Y} + \bar{Z})$  **8**

### Unit III

6. What is Combinational Logic ? What are its characteristics ? Explain the analysis procedure of Combinational logic. **16**
7. Implement the following Boolean Functions using NOR gate :  
 (a)  $F = (A + \bar{B} + C)(A + \bar{B} + \bar{C})(A + \bar{B} + C)(\bar{A} + \bar{B} + C)$   
 (b)  $F = \bar{A}BC + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$ . **16**

### Unit IV

8. What is Multiplexer ? Explain all types of Multiplexer by using an example. **16**
9. (a) Explain Half Subtractor. **8**  
 (b) What is Decoder ? Design  $5 \times 32$  decoder with the help of  $3 \times 8$  decoder. **8**

Roll No. ....

Total Pages : 04

BCA/D-20

1194

COMMUNICATIVE ENGLISH

BCA-115

Time : Three Hours]

[Maximum Marks : 80

**Note :** Answer *five* questions in all, selecting exactly *one* question from each Unit. All questions carry equal marks.

### Unit I

1. How did Gandhiji import the training of the spirit ?

*Or*

Discuss the play as a satire upon the Judicial system.

(Rory Aforesaid)

2. (i) How does otto react when he learns that Dr. Krauss is coming to visit them ?
- (ii) Why would not Mr. Thomson be able to appear on behalf of MacCullum ?
- (iii) How did Ranji lost the “magic” bat ?
- (iv) How did the death fell his mother come about ?
- (v) What was the complaint against foreman ? What was Foreman’s reply ?

(3)L-1194

1

- (vi) What is Narayan's opinion about the prevailing system of Examination ?
- (vii) What does major say about Pokero ?

## Unit II

### 3. Passage for comprehension :

At a certain university in America I met an advanced soul. He taught Political Science. One month before the annual examination, he cyclostyled the questions and distributed them among his students, who thereafter spent nearly twelve hours a day, in the library in the 'assigned reading room'.

- (a) Why is the teacher of political science described as "an advanced soul" ?
  - (b) What did the teacher do one month before the examination ?
  - (c) How did the students prepare themselves for the examination thereafter ?
  - (d) How much time did they spend in the library ?
  - (e) What conclusion can you draw from this paragraph ?
4. (a) Write an e-Mail to your friend inviting him/her to your birthday party.
- (b) Write down a fax to CEO Gary Fischer (987) 654-3210 regarding your plans to incorporate your recently acquired company into business circle.
- (c) What is the text messaging and also write down the uses of text messaging ?

### Unit III

5. Attempt any *eight* sentences based on Grammar :
- (a) He is.....S.D.O. (Put a, an)
  - (b) She is.....good girl. (Put a, an)
  - (c) Tom kills a tiger. (Change the voice)
  - (d) The peon opened the gate. (Change the voice)
  - (e) He works.....8 to 9. (Preposition)
  - (f) What's the time.....your watch ? (Preposition)
  - (g) He.....to college yesterday. (go, went)
  - (h) She.....living in this city for last two years.
  - (i) Children.....to school everyday. (go, goes)
  - (j) They.....do exercise daily. (do not, does not)
6. Write down a paragraph of about **150** words on any *one* of given topics :
- (a) Water conservation
  - (b) Female education
  - (c) Environmental pollution
  - (d) Computerisation : Its Advantages and Hazards.

### Unit IV

7. Application for the post of Manager in Company.

*Or*

Write a letter to a firm of Transistors inquiring about the pocket transistors.

8. English in situation : Opening an account in a Bank.

**Unit V**

9. Define Right to Information Act, 2005 and also explain its meaning, nature and scope of RTI, Sample RTI application form.
10. What is PIO (Public Information Officer) ? What are his/her obligations ? What kind of information can he/she refuse to give ?

Roll No. ....

Total Pages : 03

**BCA/D-20**  
**PROGRAMMING IN 'C'**  
**BCA-116**

**1195**

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all. Q. No. **1** is compulsory.  
In addition to compulsory question, attempt *four* more questions selecting *one* question from each Unit.

**(Compulsory Question)**

1. (a) How is string constant different from character constant ?
- (b) List the operators having right to left associativity.
- (c) How infinite loop is created ?
- (d) Can formal arguments and actual arguments have the same name ?
- (e) What is the default storage class of the variable ?
- (f) What are the inherent dangers of using external variables ?

**4,2,2,2,2,4**

### **Unit I**

2. Explain the characteristics and limitations of 'C' language. **16**
3. (a) What are the rules for naming identifier ?  
(b) Explain the purpose of various, backslash characters available in 'C'. **6,10**

### **Unit II**

4. (a) Discuss the hierarchy of operators ?  
(b) Differentiate between automatic types conversion and type casting. **10,6**
5. Explain switch statement. Compare it with nested IF structure. **16**

### **Unit III**

6. (a) Explain continue statement. Differentiate between continue statement and break statement.  
(b) Write a program to print prime numbers between 1 and 200. **6,10**
7. Define function. How is it declared, called and defined ? Explain. **16**

## Unit IV

8. Explain the following :
- (a) Scope of auto and static variables
  - (b) Lifetime of static and External variables **8,8**
9. (a) How a linear array is declared and initialized ?  
How are the elements accessed ?
- (b) Write a program to find largest and smallest among  $n$  array elements. **6,10**

Roll No. ....

Total Pages : 02

**BCA/D-20**

**1196**

**OBJECT ORIENTED PROGRAMMING  
USING C++  
BCA-231**

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit in addition to compulsory Q. No. 1.

1. (a) Differentiate between structure and class.  
(b) How destructor function is defined ?  
(c) How array of objects are created ?  
(d) What are the functions available in C++ for manipulating strings ? **4×4=16**

**Unit I**

2. Explain uses of scope resolution operator giving example. **16**
3. (a) How class is declared ? How objects are created ? And member functions are called ?  
(b) What are different ways of defining member functions ? Give examples. **8,8**

**(3)L-1196**

## Unit II

4. Write a program to add two complex numbers. Use constructors only. **16**
5. Explain various manipulators used for formatting the console I/O. **16**

## Unit III

6. (a) What is Friend function ? What are its characteristics ?  
(b) Write a program to find average of  $n$  numbers ? (Use friend function for finding average). **8,8**
7. (a) What are reference variables ? How are they declared ?  
(b) Write a program to interchange the value of two variables by using formal parameters as reference variables. **8,8**

## Unit IV

8. (a) What is Operator Overloading ? What are the rules of operator overloading ?  
(b) Write a program to overload operator + so that it joins two strings. **8,8**
9. Describe Inline Function. In what situations Inline function does not work ? Give example. **16**

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1197**

DATA STRUCTURES

BCA-232

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit in addition to compulsory Question No.1. All questions carry equal marks.

**(Compulsory Question)**

1. (a) Define Data Structure. Write a short note on complexity of algorithm. 4
- (b) How array and linked list differ from each other ? Explain. 4
- (c) Write a short note on applications of stack and queue. 4
- (d) Differentiate between tree and graph. 4

**Unit I**

2. (a) Give classification of data structures with suitable examples. 10

(5)L-1197

- (b) Elaborate on various data structure operations. 6
- 3. (a) Elaborate on various applications of data structures. 8
- (b) Write a short note on string operations. 8

### **Unit II**

- 4. Define arrays and its types. Explain representation of one-dimensional and two-dimensional arrays in memory. Which operations can be performed on one-dimensional arrays ? 16
- 5. How linked list is represented in the memory of computer ? Explain traversing a linked list with suitable example. 16

### **Unit III**

- 6. Define Stack. Which operations can be performed on Stack ? Explain in detail with suitable examples. 16
- 7. How the queue can be implemented using array ? Explain with suitable examples. Also elaborate on the type of operations that can be performed on queues. 16

#### **Unit IV**

- 8.** What is the difference between general tree and binary tree ? Explain the concept of tree traversal with suitable examples. **16**
- 9.** How can we represent graphs in memory ? Explain the concept of traversing a graph with suitable examples. **16**

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1198**

COMPUTER ARCHITECTURE

BCA-233

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit in addition to compulsory Q. No. 1. All questions carry equal marks.

**Compulsory Question**

1. (a) Draw logic diagram of ADDER circuit.
- (b) What is Instruction Code ?
- (c) What is RTL ?
- (d) Explain circular shift left micro-operation with example.
- (e) What do you mean by control memory ?
- (f) What is the function of Microprogram Sequencer ?
- (g) Define Zero address instruction.
- (h) Write functions of I/O Interface. **8×2=16**

**Unit I**

2. (a) Write Instruction Format of a basic computer. **4**

(2)L-1198

- (b) What are the functions of Control Unit in Computer ? 4
  - (c) Explain logic circuit for memory read and write operations. 8
3. Explain various Register Reference Instructions. 16

### Unit II

- 4. (a) Explain design of Control Unit. 8
  - (b) Explain various Logic Micro-operations. 8
5. (a) Design 4-bit ALU circuit and explain its I/O operations. 8
- (b) What will be the register value of binary data 10110110 after the following operations ? 8
- (i) Shift Left
  - (ii) Shift Right
  - (iii) Circular Shift Left
  - (iv) Circular Shift Right. 4×2=8

### Unit III

- 6. (a) Explain stack organization with its operations. 8
- (b) Design Microprogram control unit and explain its working. 8

7. Write notes on the following :
- (a) Program Control Data Transfer **8**
  - (b) Program Interrupt. **8**

**Unit IV**

8. (a) Explain the role of Virtual Memory. **8**
- (b) How is Cache Memory useful in increasing processing speed ? **8**
9. Distinguish RISC and CISC. Also describe various RISC instruction sets. **16**

Roll No. ....

Total Pages : 02

**BCA/D-20**

**1199**

SOFTWARE ENGINEERING

BCA-234

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit in addition to the compulsory Q. No. 1.

**(Compulsory Question)**

1. (a) Name the characteristics of SRS.
- (b) Data Dictionary is called structured repository of data. Explain.
- (c) What is the difference between alpha and beta testing ?
- (d) Name the steps of software maintenance. **4×4=16**

**Unit I**

2. Explain the prototype model of software development. **16**
3. Discuss the factors on which software quality depends.

**16**

(2)L-1199

1

## **Unit II**

4. Explain the methods used for problem analysis. **16**
5. What are the components of SRS ? Explain briefly. **16**

## **Unit III**

6. Define module coupling and explain various types of module coupling. **16**
7. Describe various problems during maintenance. Describe some solutions to these problems. **16**

## **Unit IV**

8. (a) What are Project Management Activities ? What are issues ?  
(b) What is quality assurance plan ? How defects are injected in software and are how they removed ?  
**4,12**
9. Explain the following briefly :
  - (a) Verification and validation
  - (b) System testing
  - (c) Acceptance testing. **16**

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1200**

FUNDAMENTALS OF DATABASE SYSTEM

BCA-235

Time : Three Hours]

[Maximum Marks : 80

**Note :** Q. No. 1 is compulsory. In addition to that attempt *four* more questions, selecting exactly *one* question from each Unit. All questions carry equal marks.

### Compulsory Question

1. (a) What is difference between data and information ?
- (b) What is the need of DBMS ?
- (c) Name various components of DBMS.
- (d) Difference between primary and secondary key.
- (e) What is the role of database designer ?
- (f) What is E-R data model ?
- (g) Define Tuple and attribute.
- (h) What is instance of a schema ? Define with example.

**2×8=16**

### Unit I

2. How database system is different from traditional file system ? Explain along with advantages and disadvantages of database system. **16**

(2)L-1200

1

3. Explain various types of database users. Explain the role of each in detail. **16**

### **Unit II**

4. (a) What is Data Independence ? Explain various types of data independence. **8**  
(b) Define the following terms : **8**  
Schema, Subschema, Instance of Schema, Data Dictionary.
5. What is Centralized and client server architecture of DBMS ? Explain. **16**

### **Unit III**

6. What do you mean by Data Model ? Discuss the various types of Data Model along with their advantages and disadvantages. **16**
7. (a) Draw an E-R diagram for Company database system. **8**  
(b) What is an Entity ? Explain the term weak and strong entity. **8**

#### Unit IV

8. (a) What are relational constraints ? Explain with example. Define : **8**
- (i) Data value
  - (ii) Super Key
  - (iii) Domain
  - (iv) Candidate Key.
- (b) What is relationship between tables and views in relational database management systems ? Explain with example. **8**
9. (a) What is a relation model ? Explain various properties of a relation. **8**
- (b) Explain the following terms :
- (i) Degree of a relation
  - (ii) Cardinality of the relation
  - (iii) Extension
  - (iv) Intension. **8**

Roll No. ....

Total Pages : 05

**BCA/D-20**

**1201**

COMPUTER ORIENTED NUMERICAL  
METHODS

Paper : BCA-236

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. (a) An approximate value of  $\pi$  is given 3.14278152 and its true value is 3.14159265. Find absolute, relative and percentage errors in the value of  $\pi$ . **3**
- (b) Deduce the order of convergence of Newton Raphson method. **3**
- (c) Establish a relationship between  $\Delta$  (forward difference operator) and  $\nabla$  (backward difference operator). **3**
- (d) Find the suitable initial approximate value of real roots of equation  $x^3 - 9x + 1 = 0$  ? **2**

(5)L-

- (e) Illustrate ill conditions in equation with one example. **3**
- (f) Construct the divided difference table for the data  
(0, 1), (1, 4) (3, 40) and (4, 85). **2**

### Unit I

2. (a) Using Newton-Raphson method, find a real root of equation  $f(x) = 3x^2 - 2x + 1 = 0$  by choosing initial approx. upto 3 iterations. **8**
- (b) Explain normalized representation of floating point-numbers and discuss advantages and limitation of narmalised representation. **8**
3. (a) Using Barvstow's method to find a quadratic factor of polynomial :
- $$x^5 + 2x^4 - 4x^3 + 5x^2 + 5x + 4 = 0$$
- upto 2 Iterations. **8**
- (b) Develop method to find the value of  $\sqrt{N}$ , where N

is a real number by using Iterative method. **8**

### Unit II

4. (a) Solve the system of equations :

$$6x_1 - 2x_2 + x_3 = 11$$

$$-2x_1 + 7x_2 + 2x_3 = 5$$

$$x_1 + 2x_2 - 5x_3 = -1$$

starting with initial vector  $[0, 0, 0]$  using Gauss Seidel method up to 2 Iterations. **8**

- (b) Given  $\frac{dy}{dx} = xy + y^2$  and  $y(0) = 1$ ,  $y(0.1) = 1.1169$ ,

$y(0.2) = 1.2773$  and  $y(0.3) = .2267$ . Evaluate  $y(0.4)$  by predictor corrector method ? **8**

5. (a) Using Gauss Elimination method, solve the system of equations i.e. :

$$28x + 4y - z = 32$$

$$x + 3y + 10z = 24$$

$$2x + 17y + 4z = 35. \quad \mathbf{8}$$

- (b) Find  $y(0.1)$ ,  $y(0.2)$  and  $y(0.3)$  from  $\frac{dy}{dx} = x + y^2$ ;

$y(0) = 1$  by using Runge Kutta method of 4th order and find  $y(0.4)$ . **8**

### Unit III

6. (a) Using Lagrange's interpolation formula, find the interpolated value of  $f(x)$  for  $x = 3$  for table :

$x$	:	3.2	2.7	1.0	4.8	
$f(x)$	:	22.0	17.8	14.2	38.2	<b>8</b>

- (b) The table gives the distance in nautical miles of visible horizon for height in feet above the earth surface as :

Height ( $x$ )	:	100	150	200	250	300	350	400
Distance ( $y$ )	:	10.63	13.03	15.04	16.81	18.42	19.9	21.27

Find the value of  $y$  when  $x = 218$  feet using Newton Gregory forward interpolation formula. **8**

7. (a) Given  $\frac{dy}{dx} = x + y^2$ ;  $y(0) = 1$  using Taylor's series method to find value of  $y(0.1)$ ,  $y(0.2)$  and  $y(0.3)$ .

**8**

- (b) Define Chebyshev's polynomials and their orthogonal properties. Write one application of Chebyshev's polynomial. **8**

#### Unit IV

8. (a) Given that :
- |     |   |       |       |       |       |       |       |        |
|-----|---|-------|-------|-------|-------|-------|-------|--------|
| $x$ | : | 1.0   | 1.1   | 1.2   | 1.3   | 1.4   | 1.5   | 1.6    |
| $y$ | : | 7.989 | 8.403 | 8.781 | 9.129 | 9.450 | 9.750 | 10.310 |
- Find  $\frac{dy}{dx}$  at  $x = 1.1$ . **8**
- (b) Using Trapezoid's rule, calculate  $\int_0^1 x^2 dx$  by taking  $h = 0.2$ . **8**
9. (a) Apply Gaussian Quadrature formula to evaluate  $\int_0^2 x^{-2} dx$ . **8**
- (b) Using Simpson's  $\frac{1}{3}$ rd rule evaluate  $\int_0^1 (1+x)^3 dx$  using  $n = 6$  strips. **8**

Roll No. ....

Total Pages : 03

OBCA/D-20

1228

'C' PROGRAMMING-II

BCA-231

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. (a) Name the library function to find the length of the string. Give example.
- (b) Write a note on enumeration.
- (c) Write the purpose of size of operator in pointers.
- (d) What are the operations permissible on pointers ?
- (e) Name the function for reading a single character from a file.
- (f) Differentiate between printf and fprintf.
- (g) Draw a comparison between #def and #if directives.
- (h) Write the purpose of #include directives. **8×2=16**

**(3)L-1228**

### Unit I

2. (a) What do you mean by string ? Differentiate between string constant and string variable. Explain strcmp( ),strupr( ), getche( ) and puts( ) function by giving suitable example.
- (b) Write a program in C to concatenate two strings. **10+6=16**
3. (a) How does a structure differ from an array ? How can an entire structure be passed to a function ?
- (b) What is meant by nesting of structure ? Discuss the only restriction that applies to the nesting of structures. **8+8=16**

### Unit II

4. What is a pointer ? Explain, how the pointer variables declared and initialized ? Write a C program to swap two numbers using call by pointers method. **16**
5. Explain the following with suitable example :
- (a) Pointer conversion
- (b) Dynamic allocation using pointers. **8+8=16**

### Unit III

6. What is a File ? Discuss different types of file. Explain with an examples the different operations may be performed on a file. **16**

7. Discuss random-access I/O in files. Explain the following file functions with examples : **16**
- (a) `fseek( )`                      (b) `read( )`
  - (c) `fgets( )`                        (d) `fscanf( )`
  - (e) `feof( )`.

#### **Unit IV**

8. What precautions one should take when using macros with arguments ? Explore the disadvantages in use of a macro. **16**
9. Write notes on the following : **8+8=16**
- (a) Command line arguments
  - (b) Macro *versus* functions.

**OBCA/D20: 1229**  
**BCA-232: Data Structures-I**

Time: 3 hrs]

[Max. Marks: 80

**Note:** Attempt five questions in all selecting one from each Unit. Question No. 1 is compulsory.

**COMPULSORY QUESTION**

- Q1 (a) Explain Big-O notation with the help of example. (4)  
 (b) Discuss the applications of Linked lists. (4)  
 (c) Discuss polish notation. (4)  
 (d) Discuss the properties of tree. (4)

**UNIT -I**

- Q2 What is the use of data structures? Discuss various data structure operations. Also explain how the complexity of an algorithm can be calculated. (16)
- Q3 (a) Explain the following string operations: (10)  
 (i) Concatenation  
 (ii) Insertion  
 (iii) Deletion  
 (iv) Replacement  
 (b) Find the table and corresponding graph for the second pattern matching algorithm where the pattern is P=ababab. (6)

**UNIT -II**

- Q4 (a) Write down the algorithm for inserting an element at  $k^{\text{th}}$  position in an array. (8)  
 (b) What is a Sparse matrix? How can you store a sparse matrix using linear array? Explain. (8)
- Q5 (a) Write an algorithm to search an element from a given linked list. (8)  
 (b) Explain Header linked list and Two-way linked list using suitable examples. (8)

**UNIT -III**

- Q6 (a) What is a stack? Explain various operations that can take place on a stack. (8)  
 (b) Define recursion. Write a recursive algorithm to find factorial of a number. (8)
- Q7 What do you mean by queue? How queue is stored in computer memory? Also explain in brief the concept of dequeue. (16)

**UNIT -IV**

- Q8 (a) Discuss the concept of full binary tree and complete binary tree. Differentiate between the two using suitable examples. (8)  
 (b) Explain various methods of representation of a binary tree along with their advantages and disadvantages. (8)
- Q9 What is a graph? Describe the sequential and linked representation of graphs. (16)

Roll No. ....

Total Pages : 02

**OBCA/D-20**

**1230**

COMPUTER ARCHITECTURE-I

BCA-233

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all. Select *one* question from each Unit. Q. No. **1** is compulsory.

**Compulsory Question**

1. (a) Write working of LASER Printer.  
(b) Name four addressing modes.  
(c) What is significance of GPR ?  
(d) What is Destination Oriented Transfer ?

**Unit I**

2. Explain concept of Data transfer using Serial and Parallel.
3. Discuss Handshaking and Synchronous data transfer.

**Unit II**

4. (a) Explain concept of status flip-flops.  
(b) Explain accumulator and shift counter.

(2)L-1230

5. (a) Explain Booth's algorithm for multiplication.
- (b) Discuss Multiplication using Power of 2 Radix.

### **Unit III**

6. Explain memory and its advantages. Discuss Associative Memory.
7. Explain use of Cache Memory and explain multilevel caches.

### **Unit IV**

8. Explain using 3, 2, 1, 0 addressing modes to solve :  
$$(A + B) * (C - D).$$
9. Explain Microprogramming with its control unit.

Roll No. ....

Total Pages : 03

**OBCA/D-20**

**1231**

INTRODUCTION TO DATABASE SYSTEM

BCA-234

Time : Three Hours]

[Maximum Marks : 80

**Note** : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

### Compulsory Question

1. Define the following terms : **8×2=16**
- |                  |                         |
|------------------|-------------------------|
| (a) File         | (b) Record              |
| (c) Data Manager | (d) Query processor     |
| (e) Entity Set   | (f) Composite attribute |
| (g) Domain       | (h) Entity Integrity.   |

### Unit I

2. Define DBMS. Explain the functioning of DBMS along with its components. **16**
3. (a) What is the need of Database System ? How is it beneficiary over file management system ? Explain by giving suitable example. **8**

(2)L-1231

1

- (b) Briefly describe the different types of users in DBMS. **8**

### **Unit II**

4. Explain record based data model and its characteristics and types in detail. **16**
5. Differentiate between the following :
- (i) Logical Data Independence vs. Physical Data Independence **6**
  - (ii) Centralized DBMS vs. Client Server Architecture DBMS. **6**
  - (iii) Schema vs. Instances. **4**

### **Unit III**

6. Define E-R Model along with its advantages. Create E-R Model for Banking System. **16**
7. Write short notes on the following :
- (a) Generalization and Specialization **8**
  - (b) Entity Type and Relationship Type. **8**

### **Unit IV**

8. Explain all the keys used in relational model by giving suitable example. **16**

9. (a) What do you mean by base table and views in RDBMS ? How does base table differ from views in RDBMS ? **8**
- (b) How insert, delete and update operation is performed over a relation ? Which relational constraints may be violated during these operations ? **8**

Roll No. ....

Total Pages : 03

**OBCA/D-20**

**1232**

STRUCTURED SYSTEM ANALYSIS AND  
DESIGN  
BCA-235

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit in addition to compulsory Question No.1.

1. Define the following : **8×2=16**
- (a) Open System
  - (b) Closed System
  - (c) HIPO
  - (d) Pseudocode
  - (e) Cost/Benefit Analysis
  - (f) Form Design
  - (g) Testing
  - (h) Quality

**Unit I**

2. Define the term 'System' and elaborate its characteristics.

**16**

3. Discuss the role of a 'system analyst'. 16

### Unit II

4. What is feasibility study ? What are its various types ?  
Discuss the role of feasibility study in overall SDLC. 16
5. Briefly example the following : 4×4=16
- (a) DFD
  - (b) Data Dictionary
  - (c) Pseudocode
  - (d) Flowchart.

### Unit III

6. Explain pros and cons of various files organization methods. 16
7. Briefly explain the following : 4×4=16
- (a) File
  - (b) Database
  - (c) Cost/Benefit Analysis
  - (d) Data Independence.

### Unit IV

8. Explain, how testing ensures quality in a system ? 16

9. Briefly explain the following : **4×4=16**
- (a) Quality Assurance
  - (b) Maintenance
  - (c) Implementation
  - (d) System Testing.

Roll No. ....

Total Pages : 03

**OBCA/D-20**

**1233**

MATHEMATICAL FOUNDATION-III

BCA-236

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all. Q. No. 1 is compulsory. Attmept *four* more questions selecting exactly *one* question from each Unit. All questions carry equal marks.

### Compulsory Question

1. (a) What is the derivatives of  $f(x) = 2x^5 \cosh x$  ?
- (b) State Leibnitz's theorem.
- (c) State Maclaurin's theorem.
- (d) Define subtangent and subnormal.
- (e) State method of finding regular asymptote.
- (f) State the criteria for testing concavity.
- (g) What is an evolute ?
- (h) Differentiate between polar and Cartesian coordinates. **8×2=16**

### Unit I

2. (a) Calculate the derivative of  $y = x^{nx}$ . **8**  
(b) Prove that : **8**

$$\frac{d}{dx} \sin^{-1} x = \frac{\frac{du}{dx}}{\sqrt{1-u^2}}$$

3. (a) If  $y = \sin 5x \sin 2x$ ,  
 $\frac{d^n y}{dx^n} = \frac{1}{2} \left[ 3^n \cos \left( 3x + \frac{n\pi}{2} \right) - 7^n \cos \left( 7x + \frac{n\pi}{2} \right) \right]$ . **8**  
(b) Find  $n$ th derivative of  $y = x^2 a^x$ . **8**

### Unit II

4. State and prove Taylor's theorem. **16**  
5. (a) Evaluate : **8**

$$\lim_{x \rightarrow 0} \left( \frac{\tan x}{x} \right)^{\frac{1}{x^2}}$$

- (b) Find the equation of tangent and normal to the curve  $x^{(2/3)} + y^{(2/3)} = 2$  at  $(1, 1)$ . **8**

### Unit III

6. (a) Find point of inflexion of the curve  $y = 3x^4 - 4x^3 + 1$ . **8**

(b) Find asymptotes of the curve  $y = (x+3)/(x+2)$ . **8**

7. (a) Find the asymptotes of : **8**

$$(x^2 - y^2)(x + 2y + 1) + x + y + 1 = 0$$

(b) Find the position and nature of the double points of the curve : **8**

$$y^2 = (x-2)^2(x-1)$$

#### Unit IV

8. (a) If  $C_x$  and  $C_y$  be the chords of curvature parallel to co-ordinate axis at any point of the curve

$$y = C \left( \frac{e^{\frac{x}{c}} + e^{-\frac{x}{c}}}{2} \right); \text{ prove that : } **8**$$

$$4C^2(C_x^2 + C_y^2) = C_y^4$$

(b) Find the radius of curvature for the curve  $\sqrt{x} + \sqrt{y} = \sqrt{a}$  at the point  $(a/4, a/4)$ . **8**

9. (a) Trace the curve : **8**

$$x^2 = (y-1)(y-2)(y-3)$$

(b) Trace the curve : **8**

$$r^2 = a^2 \cos 2\theta$$

Roll No. ....

Total Pages : 03

BCA/D-20

1202

WEB DESIGNING FUNDAMENTALS

Paper : BCA-351 (Opt. N.A.)

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all. Q. No. **1** is compulsory.  
Attempt *four* more questions, selecting *one* question  
from each Unit. All questions carry equal  
marks.

**1.** Write notes on the following :

- (i) URL 2
- (ii) DNS 3
- (iii) FTP 2
- (iv) What do you mean by 'Hypertext' in HTML ? 2
- (v) Why HTML is not considered a programming language ? 2
- (vi) Differentiate between a Web Browser and a Search Engine using suitable example. 3
- (vii) Differentiate between a website and a webpage. 2

(5)L-1202

### **Unit I**

2. Define Web Server. How a web server is different from any other computer ? Explain the role of web servers in Internet based communication. **16**
3. (a) Explain Hypertext Transfer Protocol. How HTTP is different from HTTPS ? **8**  
(b) What is the role of Internet Protocol (IP) in Internet ? Briefly explain IPv4 and IPv6. **8**

### **Unit II**

4. (a) Explain different steps involved in developing a website. **8**  
(b) Explain different Principles of good website design. **8**
5. Explain website development process in detail. **16**

### **Unit III**

6. (a) What is HTML ? Write history of HTML evolution. What are different elements of HTML program ? **8**  
(b) Create a webpage in HTML to indicate use of List <LI> tag. Use all types of lists in your webpage. **8**

7. (a) Explain usage of Marquee tag in HTML with suitable example. **8**
- (b) Explain Font tag in HTML, giving all its attributes. Also create a webpage to indicate its use. **8**

#### **Unit IV**

8. How can we create a table in HTML webpage ? Explain all tags used in table creation. Also write a program for creating a table of your choice with proper formatting. **16**
9. (a) What is a form ? Describe syntax and use of <FORM> tag. **8**
- (b) Explain the following tags in HTML using suitable example : **8**
- (i) Radio Button            (ii) Check Box.

Roll No. ....

Total Pages : 04

**BCA/D-20**

**1203**

OPERATING SYSTEM-I

Paper : BCA-352

Time : Three Hours]

[Maximum Marks : 80

**Note** : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory.

1. (a) What is an operating system ? Explain its main functions.
- (b) What is a process ? What is the difference between a program and a process ?
- (c) What are the objectives of scheduling ?
- (d) Describe the operations on processes.
- (e) What is a deadlock ? What are the necessary conditions for a deadlock ?
- (f) Describe critical section.
- (g) What is the difference between paging and segmentation in Memory Management ?
- (h) Explain various input/output communication techniques.

(5)L-1203

1

### Section A

2. (a) Explain different types of operating systems in detail.  
What is the difference between batch processing and online processing ?
- (b) What is client server model ? How is it different from other operating system structure ? Write various advantages of client server model. **16**
3. (a) Explain different process states and their transitions.
- (b) What is CPU scheduling ? What are the creterias for CPU scheduling ? Also give a brief description of levels of CPU scheduling (schedulers). **16**

### Section B

4. (a) Explain the concept of time sharing system in detail.  
What is time slice ? How time sharing systems are different from distributed systems ?
- (b) Explain the concept of parallel processing systems.  
What are the *three* commonly used architectural models for parallel machines ? **16**

5. (a) Explain various methods for handling deadlocks in detail.
- (b) Explain various deadlock detection and recovery algorithms. **16**

### **Section C**

6. (a) Explain the concept of memory management. What are the different techniques of memory allocation in a system ? What are the advantages and disadvantages of different memory allocation techniques ?
- (b) Describe the concept of Page Memory Management or Paging in detail. **16**
7. (a) Explain the concept of virtual memory in detail. Write its advantages and disadvantages.
- (b) What is demand paging ? What is a page fault ? Write the steps to handle a page fault. **16**

### **Section D**

8. (a) Explain the concept of file management in detail. What are the different methods for accessing a file ?

- (b) Write short notes on the following :
  - (i) Contagious allocation method
  - (ii) Linked allocation method
  - (iii) Indexed allocation method. **16**
  
- 9. (a) Explain the concept of real time systems. How are they different from time sharing systems ?
- (b) Define multiprogramming. How is it different from multitasking O.S. ? Explain, how multiprogramming ensures effective utilisation of main memory and CPU ? **16**

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1204**

ARTIFICIAL INTELLIGENCE

BCA-353

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all. Q. No. 1 is compulsory.

In addition to compulsory question, student will have to attempt *four* more questions, selecting *one* question from each Unit. All questions carry equal marks.

**(Compulsory Question)**

1. (a) Discuss Turing Test 4
- (b) What are the advantages of Speech Recognition ? 4
- (c) What is Expert System ? Discuss. 4
- (d) Explain Best First Search. 4

**Unit I**

2. What is Artificial Intelligence ? Discuss methods of Problem representation in AI along with their characteristics. 16

(5)L-1204

1

3. Discuss the historical evolution of AI. Also discuss the various application areas of AI. **16**

### **Unit II**

4. Discuss the features of Expert System. Also discuss the various categories of Expert System. **16**
5. (a) Explain the life-cycle of an Expert System. **8**  
(b) Discuss the application areas of Expert Systems. **8**

### **Unit III**

6. Explain Brute Force Search Techniques with suitable example. **16**
7. Explain the following :
- (a) Mean End Analysis **8**  
(b) Hill Climbing Algorithm. **8**

### **Unit IV**

8. Explain need of natural language processing. What are the solutions of Natural Language Processing Problems ? Discuss. **16**

9. (a) Explain the concept of a robot along with its major components. **8**
- (b) Discuss the following :
- (i) Intelligent Robots
  - (ii) Mobile Robots. **8**

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1205**

COMPUTER NETWORKING

Paper : BCA-354

Time : Three Hours]

[Maximum Marks : 80

**Note :** Candidates are required to attempt *Five* questions in all. Q. No. **1** is compulsory. In addition to compulsory question, candidates have to attempt *four* more questions, selecting *one* question from each Unit. All questions carry equal marks.

**Unit I**

1. (a) Write a short note on Repeaters. 2
- (b) Explain Web Based Model. 2
- (c) Define Baud Rate. 2
- (d) What do you mean by Cable Modem ? 2
- (e) What is Load shedding ? 2
- (f) Write a short note on CSMA. 2
- (g) Write short note on Digital Signature. 2
- (h) What do you mean by Token Ring ? 2

(5)L-1205

## **Unit II**

- 2. Explain OSI model in detail. **16**
- 3. (a) Differentiate between client server model and Peer to Peer Network Model. **8**
- (b) Write a short note on connectors, PC cards, Bridges, Transceivers. **8**

## **Unit III**

- 4. (a) Explain wireless Transmission Media in detail. **8**
- (b) Explain ADSL in detail. **8**
- 5. Explain Switching Techniques in detail. **16**

## **Unit IV**

- 6. (a) Explain ALOHA and Slotted ALOHA in detail. **8**
- (b) Explain Sliding Window Protocol. **8**
- 7. Give a brief description of various wired technologies. **16**

## **Unit V**

- 8. (a) Distinguish between Distance vector routing and Link State Routing. **8**

- (b) Define Choke Packets and Flooding. **8**
- 9. (a) What are Firewall ? Explain types of firewall. **8**
- (b) Explain shortest path routing. **8**

Roll No. ....

Total Pages : 02

**BCA/D-20**

**1206**

PROGRAMMING USING VISUAL BASIC

Paper : 355

Time : Three Hours]

[Maximum Marks : 80

**Note** : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. Attempt all parts of this question : **16**
- (i) VB as Event driven and object based Language
  - (ii) Scope and life time of a variable
  - (iii) Static and dynamic array
  - (iv) General and event procedure.

**Unit I**

2. Explain the various features of Visual Basic (VB). **16**
3. Explain the default controls in Event Driven programming. **16**

**Unit II**

4. Explain various data types available in Visual Basic. **16**

(5)L-1206

5. Which are various controls for Input/output in VB ?  
Explain. **16**

### **Unit III**

6. Explain various decision statements in VB. **16**
7. Explain various looping statements in VB. **16**

### **Unit IV**

8. Write a program in VB to find HCF of two given numbers.  
**16**
9. Write a program in VB to find greatest among N numbers.  
**16**

Roll No. ....

Total Pages : 03

**BCA/D-20**

**1207**

MULTIMEDIA TOOLS

BCA-356

Time : Three Hours]

[Maximum Marks : 80

**Note :** Attempt *Five* questions in all. Q. No. **1** is compulsory.

In addition to compulsory question, attempt *four* more questions, selecting at least *one* question from each Unit.

1. (a) Describe the basic characteristics of requirements for selecting a multimedia authority tool.
- (b) Describe the components of multimedia.
- (c) What are the multimedia supported audio format in android ?
- (d) State ADPCM. **4×4=16**

**Unit I**

2. (a) Define multimedia authoring tools. How is it better than multimedia programming tools. **10**
- (b) Differentiate hypermedia and multimedia. **6**

(5)L-1207

3. What are the hardware and software requirements for multimedia computer ? Explain the various multimedia applications. **16**

### **Unit II**

4. (a) Distinguish between the following : **8**  
(i) Image and graphics  
(ii) Video and animation.  
(b) Write a short note on Analog Video Standards :  
PAL and SECA. **8**
5. Explain various color models in images and videos. **16**

### **Unit III**

6. What is quantization in multimedia ? How to perform the transmission of audio ? Explain. **16**
7. (a) With a diagram show how MIDI instruments can be interfaced with a PC. **10**  
(b) What is pulse code modulation ? **6**

### **Unit IV**

8. Explain run-length coding and transform coding in detail. **16**

9. (a) Discuss in detail the JPEG compression scheme. **6**
- (b) Explain any *two* video compression techniques : **10**
- (i) H.261
  - (ii) H.263
  - (ii) MPEG.